



## United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Western Washington Fish and Wildlife Office  
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In Reply Refer To:  
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## Memorandum

To: Assistant Regional Director, Migratory Birds and State Programs, Region 1  
Portland, Oregon

From:  Manager, Western Washington Fish and Wildlife Office  
Lacey, Washington

Subject: Consultation on Caspian Tern Management to Reduce Predation of Juvenile  
Salmonids in the Columbia River Estuary

This is in response to your letter dated January 5, 2005, attached Biological Assessment, and additional information dated February 14, 2005, regarding the proposed Caspian Tern Management to Reduce Predation of Juvenile Salmonids in the Columbia River Estuary project. Your letter and Biological Assessment were received in our office on January 6, 2005, and additional information received on February 17, 2005. Your letter requests our concurrence with your finding that the project "may affect, but is not likely to adversely affect" the bull trout (*Salvelinus confluentus*), bald eagle (*Haliaeetus leucocephalus*) and marbled murrelet (*Brachyramphus marmoratus*). The potential effects of the proposed project to proposed bull trout critical habitat are not addressed vis this letter. This consultation has been conducted in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Purpose and Need of the Proposed Action

Recent increases in the number of Caspian terns (*Sterna caspia*) nesting in the Columbia River estuary have led to NOAA's National Marine Fisheries Service (NOAA Fisheries) concerns over their potential impact on the recovery of threatened and endangered Columbia River salmonids. In 1999, NOAA Fisheries requested that U.S. Army Corps of Engineers (COE) eliminate Caspian terns from a dredge-spoil accumulation known as Rice Island in the upper Columbia River estuary. The request for elimination of Caspian terns served the goal of decreasing the number of listed salmonids eaten by Caspian terns. In 1999, the COE initiated a pilot project to relocate Caspian terns to East Sand Island, a dredge-spoil island located near the mouth of the Columbia River estuary, where more non-salmonid fish are available to Caspian terns. The project was intended to continue in 2000; however, several environmental advocacy groups filed against the U.S. Fish and Wildlife Service (Service) pursuant to the Migratory Bird Treaty Act (16 U.S.C. 703-712).

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The environmental advocacy groups also sued the COE pursuant to the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*). In 2002, all parties reached an agreement that requires the Service, COE, and NOAA Fisheries to prepare an Environmental Impact Statement (EIS) that would, as part of the NEPA process, address Caspian tern management in the Columbia River estuary. This year, the Service selected "Preferred Alternative C" as defined in the EIS, which would reduce Caspian tern predation on juvenile salmonids in the Columbia River estuary by redistributing a portion of the Columbia River estuary Caspian tern colony to seven locations in Washington, Oregon and California.

### Proposed Project Description

The Caspian tern redistribution would be achieved by creating new or enhancing existing Caspian tern habitat at seven proposed locations. Of the seven locations proposed for Caspian tern redistribution, only the Dungeness National Wildlife Refuge (NWR) is located in Washington State. The Dungeness NWR is located on a natural sand spit in the Strait of Juan De Fuca approximately 20 miles east of Port Angeles.

The proposed project aims to improve protection for approximately 263 pairs of Caspian terns that currently nest on the spit and for additional Caspian terns that may arrive due to the reduction of nesting habitat in the Columbia River estuary. The proposed project will offer greater protection for the Dungeness NWR Caspian tern colony by efforts to reduce predation and human disturbances. To reduce human disturbances, the Service will increase educational outreach activities and place additional signs to mark existing closed areas. To curtail Caspian tern predators, fencing would be erected around the colony. No habitat modifications are proposed. In 2004, the Caspian tern population at the Dungeness NWR was monitored to understand the population's numbers and diet composition; similar monitoring may continue in 2005. Activities associated with monitoring include construction of an observation blind near the colony and personnel accessing the site daily via vehicles and/or on foot. While it is uncertain whether monitoring will occur every year, such monitoring would occur if a cursory population count indicates that the Caspian tern nesting population on the spit exceeds 500 pairs.

### Caspian Tern Biology

Caspian terns breed at scattered sites across North America. In the Pacific coast region, the population increased 70 percent from the 1960's to the 1980's (Gill and Mewaldt 1983). This increase reflects primarily the success of the Columbia River estuary Caspian tern colony nesting on Rice and East Sand Islands. The colony peaked at nearly 10,000 pairs in 2002, and it is the largest colony in the world (Shuford and Craig 2002; Collis et al. 2002). The size of the colony is particularly noteworthy because colonies typically do not exceed 1,000 pairs (Cuthbert and Wires 1999; Wires and Cuthbert 2000). Caspian tern colonies are generally restricted to the breeding season, which typically lasts from May through August, but small numbers may be found in April and September. Caspian terns typically nest in open, barren to sparsely vegetated areas surrounded by or adjacent to driftwood, partly buried logs, rocks, or tall annual vegetation.

Caspian terns generally lay 2 to 3 eggs, with the incubation lasting 20 to 22 days. One study observed that 50 percent of Caspian terns foraged within 4 miles of their nest habitat and 90 percent foraged within 9 miles (Collis et al. 1999). Caspian terns generally forage in large open

areas with deep waters, such as lakes or estuaries (Roby, pers. comm. 2005; Seto, pers. comm. 2005). They feed almost exclusively on fish, by using shallow plunge dives to catch a diverse array of species (Cuthbert and Wires 1999). Caspian tern feeding habits are simple: they take any type of fish that swim near the surface of the water, and range between 2 and 10 inches in length (Service 2005). Caspian terns each consume approximately 1,000 fish per breeding season (Seto, pers. comm. 2005). Hatched Caspian terns become able to fly in approximately 4 to 5 weeks, and the colonies generally dissolve a month later, when Caspian terns start migrating along the coast.

#### Caspian Terns in the Dungeness National Wildlife Refuge

Caspian terns started nesting at the Dungeness National Wildlife Refuge in the summer of 2003. The colony was monitored in 2004 to gain a better understanding of colony status and diet composition. The colony is located approximately 1 mile southwest of the Dungeness Lighthouse National Historic Site. It was estimated that there were 233 to 293 breeding pairs and that 211 to 295 young fledged in 2004 (Service 2004). Most nesting failures were attributed to predators, and to a lesser extent, human disturbances. Bob Boekelheide, Director of Dungeness Audubon Center has observed Caspian terns foraging in the Strait of Juan De Fuca and Dungeness Bay and has only seen migrating (>200 feet in the air) Caspian terns over the Dungeness River. The diet of Caspian terns residing at the refuge consisted primarily of surfperch (*Embiotocidae*) (36 percent of their diet), and salmonids (*Salmonidae* [29 percent]), followed by an assortment of sculpin (*Cottidae*), herring (*Clupeidae*), pricklebacks (*Stichaeidae*), smelt (*Osmeridae*), and anehovies (*Engraulidae*), in that order (Service 2004). The fish Caspian terns caught averaged 5 inches ( $\pm 1.5$  inches) (Seto, pers. comm. 2005).

It is anticipated that some of the Caspian terns eradicated from the Columbia estuary will move to the Dungeness spit however, the constraints of available suitable nesting habitat, amount of forage food, and the fact that colonies rarely exceed 1,000 pairs, suggest that the number of Caspian tern at the Dungeness spit will not likely increase by 700 pairs.

#### Fish in the Dungeness

The area around the Dungeness NWR is home to a variety of fish species including eight types of salmonids, cod (*Gadidae*), sole (*Soleidae*), surf smelt, sand lance (*Ammodytidae*), herring, anchovies, and rock fish (*Sebastidae*). Table 1 provides the estimated average number of wild and hatchery salmonids, and the methods used to calculate the number of salmonids using the Dungeness Bay. The estimated number of wild salmonids is likely low because neither the adjacent Morse and Bell River watersheds, nor the numbers of sockeye salmon (*Onchorhynchus nerka*) and cutthroat trout (*Onchorhynchus clarki clarki*) were considered. Three of the salmonids located in the area are listed under the Endangered Species Act; of those, the bull trout is under Service jurisdiction. The Dungeness Bay provides rearing habitat for the following salmonid species: pink salmon (*Onchorhynchus gorbusha*), coho salmon (*Onchorhynchus kisutch*), sockeye salmon, steelhead (*Onchorhynchus mykiss*), and cutthroat trout (Service 2005).

The nearshore waters of the Strait of Juan de Fuca provide feeding habitat, refugia and a migratory corridor for many of the fish listed above. Approximately 9 miles upstream from the Dungeness River mouth, a state hatchery rears and releases steelhead, chinook salmon, and coho

salmon. Due to feeding methods used in hatcheries, hatchery produced fish tend to feed higher in the water column and therefore have a higher risk of exposure to predators (Berejikian et. al. 1999). Because of hatchery fish behavior, their size, and abundance they are likely the most common salmonids to fall prey to Caspian terns.

Table 1. Type and approximate number of wild and hatchery salmonids using the Dungeness Bay annually.

Wild salmonids present		Methods used to estimate numbers	Hatchery salmonids present		Methods used to estimate numbers
pink wild	1,169,647	3-yr average of fall and summer escapement estimates provided by WA Department of Fish and Wildlife, and fecundity and survival values from C. Groot and L. Margolis, Pacific Salmon Life Histories, 1991.			
steelhead wild	7,143	Conservative estimate from figures provided by WA Fish and Wildlife Department.	steelhead hatchery	10,000	WA Department of Fish and Wildlife data.
chum salmon wild	1,000,000	Escapement estimates provided by WA State Fish and Wildlife Department, fecundity and survival values from C. Groot and L. Margolis, Pacific Salmon Life Histories, 1991, and data from Migration of Juvenile Pink Salmon Dungeness Bay, J. Hiss, 1994.			
chinook wild	8,888	5-yr average of escapement estimates provided by WA Department of Fish and Wildlife, and fecundity and survival values from C. Groot and L. Margolis Pacific Salmon Life Histories, 1991.	chinook hatchery	1,762,795	5-year average from data received from WA Department of Fish and Wildlife.
coho wild	35,130	5-yr average of escapement estimates provided by WA Department of Fish and Wildlife, fecundity and survival values from C. Groot and L. Margolis, Pacific Salmon Life Histories, 1991.	coho hatchery	599,350	5-year average from data received from WA Department of Fish and Wildlife.
bull trout (lower Dungeness)	200	Data from Collection Report for Activities Conducted Under Scientific Collection Permit Number 00-305, J. Chan, 2001.			
Total wild salmonids	2,221,108		Total hatchery salmonids	2,372,145	
		Grand Total		4,593,253	

### Bull trout in the Dungeness

The Dungeness River is a relatively swift river approximately 32 miles in length, that provides suitable bull trout spawning, rearing, foraging, migration, and overwintering habitat. Bull trout have been documented in the Dungeness River up to an impassable barrier at river mile 24 (Service 2004b). Multiple bull trout class sizes have been observed throughout the river system, and it is likely that the watershed supports fluvial and anadromous forms of bull trout (Service 2004b). Juvenile bull trout (~6 inches in length) rear in the upper watershed and begin moving downstream to the lower river as they get older (~6 to 13 inches). Bull trout in the Dungeness River mouth or in the estuary are likely greater than 10 inches in length (Spalding, pers. comm. 2005).

### Effects to Bull Trout from Proposed Project Activities

The proposed increase in Caspian terns at the Dungeness spit has the potential to impact bull trout from predation. However, several factors limit the impact to bull trout:

- The abundance of fish other than bull trout
- Bull trout behavior and life cycle
- Caspian tern behavior

Caspian terns in the Dungeness Bay area have access to a vast amount of open and deep water, that invites Caspian terns to forage not only on river-reared salmonids, but also ocean-reared fish, such as surfperch, sculpin, and herring. To illustrate the unlikelihood of a bull trout being caught by a Caspian tern, we calculated the chance that a given salmonid is a bull trout (Table 2). Table 2 illustrates that fewer than one out of 200 salmonids present in the Dungeness estuary are bull trout. Even if we assume that there are greater numbers of bull trout or there are 100,000 fewer salmonids than was estimated, bull trout never reached 1 percent of the total salmonid in the area. Additionally, considering Caspian terns opportunist feeding habitats, timing of hatchery released fish, hatchery fish behavior, size, and abundance, it is likely that the majority of Caspian terns salmonid diet consists of hatchery fish.

Table 2. The relative abundance of salmonids in the Dungeness Estuary.

#### Salmoids present

pink	1,169,647
steelhead hatchery	10,000
chinook hatchery	1,762,795
steelhead wild	7,143
chum salmon wild	1,000,000
coho hatchery	599,350
chinook wild	8,888
coho wild	35,130
bull trout	200

0.004354% = the percent of salmonids that are bull trout

Caspian terns tend to forage in deep, non-turbid waters, and with the exception of the mouth, the Dungeness River should hold little appeal for foraging Caspian terns. Bull trout near the mouth

of the Dungeness and/or in the Dungeness estuary are likely greater than 10-inches, a size generally too large for Caspian terns to feed on. Caspian terns in this area have generally caught fish averaging 5-inches ( $\pm 1.5$  inches) (Seto, pers. comm. 2005). Thus, even in the unlikely event that a bull trout 7- to 9-inches should be near the mouth or in the estuary, that size class of bull trout is unlikely to be caught. If a Caspian tern feeds in the Dungeness River, bull trout are not likely caught from their tendencies to stay near the bottom of pools, underneath overhanging banks, or in debris jams.

Due to the diversity and availability of prey species for both the bull trout and Caspian tern, bull trout are not likely to be significantly affected by prey competition with a larger Caspian tern colony. While there is some overlap in the size (6 to 10 inches) of fish prey, the proposed project is not expected to have a significant effect on the number of available prey items available to bull trout.

Because of the low likelihood of a bull trout being caught by a Caspian tern, and the project activities not impacting the diversity and availability of bull trout prey, the Service has determined that the proposed project would result in insignificant and discountable effects to bull trout in Washington, and therefore we concur with your determination of "may affect, but is not likely to adversely affect" the bull trout in Washington.

#### Bald Eagle in the Dungeness Bay

Bald eagles appear to be abundant in and around the Dungeness NWR. The area contains suitable habitat for bald eagles, which is generally characterized by accessible foraging areas and trees that are large enough for nesting and roosting (Stalmaster 1987). Bald eagles use the area year-round, likely due to abundant food availability, such as aggregations of waterfowl, seabirds, and river and ocean fish. Several active bald eagle nests are located near the spit, but no known nesting activities occur directly on the spit. Nesting activities typically occur over an extended period from January 1 through August 15. Wintering bald eagles may occur in the vicinity from October 31 through March 31.

#### Effects to Bald Eagle from Proposed Project Activities

Prey resources do not appear to be a limiting factor for the bald eagle population near the Dungeness NWR given the diversity and availability of prey species. Bald eagles would typically take larger fish than Caspian terns, although there is some overlap projected for fish in the size range of 6 to 10 inches in length. It is possible that the projected increase in numbers of Caspian terns may provide additional food resources for bald eagles, as bald eagles have been documented to prey upon Caspian tern adults and young. Based upon the availability and diversity of prey species for bald eagles in the vicinity of the proposed project, the Service expects that the proposed project would have insignificant effect to bald eagles via prey resources. Also, no potential perch or nest trees will be removed, nor will any of the project activities generate above-ambient sound levels. Therefore, we concur with your determination of "may affect, but is not likely to adversely affect" the bald eagle.

### Marbled Murrelet in the Dungeness Bay

Marbled murrelets are known to forage on the water in the area of Dungeness spit. Marbled murrelets nest in old-growth forests to the south, southwest, and southeast of Dungeness spit. These birds are opportunistic feeders that generally prey on diverse sizes of fish and crustaceans. They forage at all times of the day, typically in nearshore marine waters such as Dungeness Bay. Marbled murrelets typically avoid areas with large flocks of other feeding seabirds.

### Effects to Marbled Murrelets from Proposed Project Activities

Marbled murrelets, Caspian terns, and other seabirds already share and depend on the Dungeness spit area as a significant foraging resource. There is no data to indicate what size Caspian tern colony would cause a significant disruption of forage resource availability, or resource utilization by marbled murrelets in the area of the spit. Marbled murrelets are not likely to be significantly affected by any competition with a larger Caspian tern colony, since their prey size selection is greater than that of Caspian terns and primarily includes small invertebrates as well as fish 2-inches or greater. While Caspian terns capture the same size of prey as do marbled murrelets, Caspian terns tend to forage more on surf perch and salmon smolts, whereas marbled murrelets forage more on sand lance, immature herring, anchovy, and smelt. Furthermore, marbled murrelets typically dive 5 to 10 meters below the water surface, utilizing a significantly larger section of the water column for feeding than do Caspian terns. While the two species depend on the Dungeness spit area as a significant foraging resource, the competition for food resources between marbled murrelets and the increased number of Caspian terns is expected to be minimal.

Marbled murrelets avoidance of large groups of feeding seabirds may influence foraging time and location. However, due to the vast foraging area and diversity of available prey in the Dungeness spit area, it is expected that marbled murrelets will likely continue to successfully forage in the area.

We concur with determination of "may affect, but is not likely to adversely affect" the marbled murrelet for the following reasons: (1) proposed activities will not result in destruction or degradation of marbled murrelet nesting habitat; (2) marbled murrelets are not likely to be significantly affected by competition with a larger Caspian tern colony, since their prey size and diversity is more expansive than Caspian terns; and (3) foraging space availability for marbled murrelets is not expected to be limited. Therefore the proposed project would have insignificant effects to marbled murrelet.

This concludes informal consultation pursuant to the regulations implementing the Endangered Species Act (50 CFR 402.13). This project should be reanalyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation. The project should also be reanalyzed if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or a new species is listed or critical habitat is designated that may be affected by this project.

If you have any questions about this memorandum or your responsibilities under the Endangered Species Act, please contact Yvonne Dettlaff at (360)753-9582 or Tom McDowell at (360)753-9426, of this office.

## REFERENCES

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### **PERSONAL COMMUNICATIONS**

Boekelheide, Bob: Dungeness Audubon Center, Sequim, Washington.

Seto, Nanette: U.S. Fish and Wildlife Service, Regional Office, Portland, Oregon.

Spalding, Shelly: U.S. Fish and Wildlife Service, Western Washington Fish and Wildlife Office, Olympia, Washington.

Roby, Dan: U.S. Geological Survey, Oregon Cooperative Fish and Wildlife Research Unit, Corvallis, Oregon.